

such materials when unconfined tends to render the miner even more regardless of precautions, and hence it is unquestionably wrong to foster the notion of the safety of these materials in the hands of the miner, especially as it frequently occurs that the men who use these materials are unable to read the printed instructions which are supplied by the manufacturers with the cartridges for the purpose of guarding against accident.

It does not admit of dispute that the recklessness of the miner has actually been fostered hitherto by the utter disregard of all ordinary precautions which they must but too frequently witness at the stores where the powder is sold or issued to them. The practices of small dealers in gunpowder present illustrations of ignorance and recklessness, if anything, even more appalling than those which the habits of the miners furnish. The manner in which powder is often dealt with by those in charge of the stores or magazines in quarries or mines, and who have to issue supplies to the men, is illustrated by one or two examples from a report to the Home Office by Major Majendie. As an extreme instance of recklessness the case of a man is quoted who was in the habit of boring into the barrels with a red-hot poker; on one occasion, the lid of the barrel being thinner than usual, the heated iron was thrust into the contents of the barrel, and the man fell a victim to his very original mode of dealing with packages of gunpowder.

In some mining districts it has been customary to pay no regard whatever to the suitability, in point of safety, of the localities selected for the storage of powder. It has not unfrequently been kept in large quantities (e.g. 500 lb.) in ordinary buildings, quite close to dwelling-houses. Even where magazines have been provided, in connection with extensive mines and quarries, many instances are on record of gross ignorance or carelessness in regard to the precautions essential to the safe handling of gunpowder.

The strenuous exertions of the Government inspectors during the last few years have already resulted in a considerable amelioration of this lamentable condition of things, although the existing state of the law affords them little power to enforce simple regulations which are vital to the safety of the people employed, and often of the neighbourhood, but scant regard being but too frequently paid to the position of even extensive stores or magazines with reference to contiguous habitations.

The utter inadequacy of the existing regulations as to the transport of powder, &c., by land or water, and the flagrant manner in which even these defective regulations are but too frequently disregarded, are matters to which public attention has been much directed since the explosion in October last, and which are but in harmony with the negligence and ignorance displayed to so alarming an extent in connection with the handling and storage of gunpowder. Thus, the packages (barrels, &c.) in which powder is transmitted to distant places are often so imperfectly constructed that the grains escape into the cart, or the hold of a vessel, where they may become mixed up with grit and be eventually trampled upon. As regards the vehicles in which the powder is transported, some regulations exist with respect to the employment of covered or uncovered carts with reference to quantities of powder exceeding considerable limits, but there is no law requiring carts or barges to be specially constructed or employed so as to exclude sources of danger. In the mining districts and even in towns powder is constantly conveyed in dangerous quantities in ordinary carts, which may have been used for carrying stones, coal, or road rubbish, and is often packed with other goods, such even as lucifer matches and petroleum; there is no regulation to prevent the person in charge from smoking while in his cart, or stopping at a public-house, leaving the powder standing at the door. Prof. Abel quoted instances of the reckless carriage of powder in public conveyances, and of the transport of very large quantities (many tons) of powder through crowded thoroughfares in large towns (Edinburgh and London) with little or no precautions. The disregard of necessary precautions in the transport of merchants' powder by water was dwelt upon and contrasted with the precautions adopted by Government as absolutely necessary, and some severe comments were made upon the practice, which had been common, of stowing gunpowder in barges as part of miscellaneous cargoes which include even such materials as petroleum spirit.

After referring in detail to the precautions insisted on in the transport and storage of Government gunpowder, and to the effect of recent legislation with regard to explosive substances, Prof. Abel concluded by stating that the beneficial results attainable by a systematic and thoroughly authoritative supervision,

by Government inspectors, of factories and stores of explosive agents, if conducted with intelligence and discretion, have been most convincingly demonstrated by the great good which it is admitted on all sides that the inspectors have already succeeded in accomplishing, even with the very insufficient powers which the present state of law affords them. The favourite argument of some, that Government inspection must operate mischievously, by diminishing private responsibility, has certainly received no support from the results of inspection, so far as the experiment has been tried. It will scarcely be asserted that a manufacturer or store-holder who may have willingly adopted, as suggestions which the inspector has no power to enforce, measures conducive to the safety of life and property, would be careless in the application of those measures because their adoption was no longer optional, or because the responsibility for their due observance was to some extent shared by the inspector. This very system of inspection cannot fail to benefit those interested in different branches of the industry of explosives by reducing the necessity for hard and fast rules with respect to the arrangement and conduct of works, which might in many instances entail hardship or inconvenience without any real necessity, and by strengthening the hands of factory-owners, and thus rendering comparatively easy the proper observance and enforcement of regulations for the safety of the men and the works. It is, however, especially in connection with the storage, transport, and employment of gunpowder and other explosives in mining districts that efficient inspection, supported by the reasonable power which a well-considered Act of Parliament cannot fail to afford, may be confidently expected to produce important beneficial results, not the least of which will probably be the wholesome influence exercised indirectly, by the force of example, upon the miner or pitman, whose ignorance has fostered the indifference with which long habit has led him to regard the possibility of danger.

But although improved legislation, and the beneficial regulations thus supplied, may be confidently hoped to effect an important reduction in the number and magnitude of the disasters now recorded as accidental explosions, it would obviously be worse than shortsighted to encourage a reliance upon legislation alone as a safeguard against the evils which lead to casualties of this kind. Punishments inflicted for transgression of the law may engender caution, but the disasters which arise from ignorance are not likely to be importantly reduced in number by legislative enactments alone.

It is to the general promotion of education among the people, and to the spread of scientific and technical knowledge, if even of the most elementary kind, among employers and employed, that we must look for a substantial diminution of these casualties, which the uneducated mind is but too prone to attribute to accident, and the prevention of which rests, at any rate to a large extent, with those who are at present tacitly content to regard them as inevitable.

## SOCIETIES AND ACADEMIES

### LONDON

Royal Society, April 8.—"On the Development of the Teeth of Fishes" (Elasmobranchii and Teleostei), by Charles S. Tomes, M.A.; communicated by John Tomes, F.R.S.

Observations upon many mammals, reptiles, and fishes, led the author to the following general conclusions as to the development of teeth:—

(i.) All tooth-germs whatever consist, in the first instance, of two parts, and two alone—the dentine papilla and the enamel-organ.

(ii.) The existence of an enamel-organ is wholly independent of the presence or absence of enamel upon the teeth; examples of this have been recorded by Professor Tomes and by the author among mammalia, and are common amongst reptiles and fishes.

(iii.) Nothing justifies the arbitrary division into "Papillary," "Follicular," and "Eruptive" stages; nor does any open primitive dental groove or fissure exist in any creature examined.

(iv.) In all cases an active ingrowth of a process from the oral epithelium, dipping inwards into solid tissue, is the first thing distinguishable, although the formation of a dentine papilla opposite to its deepest extremity, goes on *pari passu* with it from the development into an enamel-organ.

(v.) A special capsule or follicle to the tooth-germ may or may not be present; when present it is in part a secondary develop-

ment from the base of the dentine papilla, in a part a mere condensation of surrounding tissue.

"Experiments to ascertain the Cause of Stratification in Electrical Discharges *in vacuo*," by Warren De la Rue, Hugo W. Müller, and William Spottiswoode.

"First Report of the Naturalist attached to the Transit of Venus Expedition to Kerguelen's Island, December 1874," by the Rev. A. E. Eaton; communicated by the President.

[These are two long and important papers, which we hope to be able to be able to give next week.]

Linnean Society, April 15.—Dr. G. J. Allman, president, in the chair.—Prof. A. Dickson, M.D., Mr. J. F. Duthie, and Mr. H. C. Sorby, F.R.S., were elected fellows. The following papers were read:—On the nature and productions of the atolls of the South Pacific, by the Rev. Thos. Powell.—Papers on the botany of the *Challenger* Expedition: xxv., On the Diatomaceæ collected by Mr. H. N. Moseley in Kerguelen's Land, by the Rev. E. O'Meara; xxvi., Letter from Mr. H. N. Moseley on an edible Chinese *Sphæria*, known as "winter worm-grass," parasitic on certain larvæ (this was stated by Mr. Currey to be *Torrubia sinensis*); xxvii., On the Musci and Hepaticæ collected by Mr. H. N. Moseley, by Mr. W. Mitten, F.L.S. (these were from Teneriffe, Tristan d'Acunha, Kerguelen's Land, &c.)—On Algae collected by the Rev. W. W. Gill near the island of Mangara, by Dr. Dickie, F.L.S.—List of plants collected by Dr. A. B. Meyer in New Guinea, in 1873, by Prof. Oliver, F.R.S. (these were only ten in number, including two new species).—Mr. W. S. Mitchell made some additional observations on the male Octopus.

Chemical Society, April 15.—Prof. Abel, F.R.S., in the chair.—Mr. J. W. Thom read a paper on the gases enclosed in coals from the South Wales basin, and the gases evolved by blowers and by boring into the coal itself. These gases were found to be marsh gas, carbonic anhydride, and nitrogen, in all three of the classes of coal examined, namely, bituminous coals, steam coal, and anthracite.—A paper on narcotine, cotannine, and hydrocotannine, Part I., by Mr. P. H. Beckett and Dr. C. R. A. Wright, was then read by the latter; after which Dr. H. E. Armstrong communicated a note on isomeric change in the phenol series.

Zoological Society, April 6.—Dr. E. Hamilton, vice-president, in the chair.—A letter was read from Dr. G. Hartlaub, stating that the Finch described by him and Dr. Finsch as new in the Society's Proceedings for 1870, p. 817, and named *Lobiospiza notabilis*, was probably only the young bird of *Amblyura cyanovirens*.—Dr. A. Günther exhibited the skin of a new species of Mole from British Caffraria, which he proposed to call *Chryschloris trevelyani*.—The Secretary exhibited, on behalf of Mr. J. Gould, F.R.S., the original specimen of the Parrot (*Aprosmictus insignissimus*), spoken of by Mr. Gould in his communication to the Society on the 3rd of November, 1874 (P.Z.S., 1874, p. 499); also specimens of two other new species of birds from Northern Queensland, a new Honey-eater, proposed to be called *Ptilotis flavostriata*, and a new Parrot, proposed to be called *Cyclopsitta maccoyi*.—Mr. Osbert Salvin, F.R.S., read a memoir on the avi-fauna of the Galapagos Archipelago. After a summary of what was known of the history and physical peculiarities of these islands, Mr. Salvin proceeded to give a complete account of the birds as at present known to us from the visits of Mr. Darwin, of the naturalists of the Swedish frigate *Eugenie*, and of Dr. Habel, whose collection afforded the principal materials upon which the present communication was based. Of the fifty-seven species of birds known to exist in the Galapagos, about two-thirds were stated to be peculiar to the Archipelago.—Mr. A. G. Butler read a memoir on the Heterocerous Lepidoptera of the family Spingidae, in which a complete revision of the various genera and species of this family was given.—A communication was read from Dr. J. S. Bowerbank, entitled "A Monograph of the Siliceo-Fibrous Sponges," Part III., being the third of a series of memoirs on this class of sponges. A second communication from Dr. Bowerbank contained the seventh part of his contributions to a general history of the Spongidae.—Mr. A. H. Garrod read a paper on the form of the trachea in *Tantulus ibis*, in which the peculiar and numerous convolutions of that tube within the thorax of that bird were described.—A communication was read from Mr. G. S. Brady, in which he gave a revision of the known species of British Marine Mites, together with descriptions of some new species.—Mr. C. A. Wright read a paper on the question of the

specific identity of the Weasel found in Malta, which he was inclined to refer to *Mustela boccamela*, Bp., hitherto only known to occur in Sardinia.

#### PARIS

Academy of Sciences, April 12.—M. Frémy in the chair.—The following papers were read:—On the comparison of the first observations of the Transit of Venus; a letter addressed by M. Puiseux to M. Dumas, President of the Transit Commission. From the data, M. Puiseux (*NATURE*, vol. xi. p. 474) finds the mean solar parallax to be  $8''\cdot879$ . This value differs little from that found by experiments on the velocity of light, made by MM. Foucault and Cornu, which is  $8''\cdot86$ ; the latter is also the average value of those calculated by M. Leverrier from the perturbations of planets.—On the last number of the *Memorie di Spettroscopisti Italiani*, by M. Faye; this paper has special reference to M. Langley's memoir on the minute structure of the photosphere.—On the periodical variations and inequalities of the temperature (eleventh note); period of the twelve-fold twentieth day; by M. Ch. Sainte-Claire Deville. An extremely elaborate paper, with seven diagrams.—M. Cahours then presented to the Academy the third volume of his "Traité de Chimie Organique," and made some remarks on the same.—The Academy then nominated General Sabine as correspondent to their Section of Geography and Navigation, in lieu of the late M. Chazallon.—Researches on the transmission of air by a steam or air jet, by M. F. de Romilly.—On a new substance found in urine after the ingestion of chloral hydrate, by MM. Musculus and de Mermé. The authors gave it the name *urochloralic acid*.—A note by M. Bobierre, on the use of a little apparatus called *cherche-plomb* (lead-finder), which shows the presence of lead in alloys suspected of containing it, by contact with glacial acetic acid and iodide of potassium.—A note by M. G. Helzner, on an insect living, like *Phylloxera*, upon roots. It is principally found on *Abies balsamea* and *Abies Fraseri*.—M. R. de Wouves reminds the Academy, upon the occasion of the interesting researches now published by M. Ch. Sainte-Claire Deville, that as far back as December 20, 1870, he presented to the Academy a memoir entitled "On the Periodicity of the Weather."—Calorimetric researches on the carbon compounds of iron and manganese, by MM. L. Troost and P. Hautefeuille.—On the preparation of ethylene perchloride, by M. E. Bourgoin.—Researches on the quantities of heat disengaged in the decomposition by water of the bromides of some of the fatty acids, by M. W. Longuinine.—On the determinations of the carbonic acid of the air made in the balloon *Zenith*, by M. G. Tissandier. The percentage of carbonic acid varied between  $2\cdot40$  (at 890 metres elevation) and  $3\cdot00$  (at 1,000 metres) volumes in 10,000 volumes of air.

#### BOOKS AND PAMPHLETS RECEIVED

COLONIAL.—Monthly Record of Results of Observations in Meteorology, Terrestrial Magnetism, &c., taken at the Melbourne Observatory during August 1874: Robert L. J. Ellery (Melbourne, John Ferris).—Geological Survey of Victoria. Observations of New Vegetable Fossils of the Auriferous Drifts: Baron Ferdinand von Mueller (Melbourne, John Ferris).

AMERICAN.—Observations on the Phenomena of Plant Life. Paper presented to the Massachusetts Board of Agriculture by W. S. Clarke (Boston, Wright and Potter).

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